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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/021,988	12/13/2001	James M. Florence	SLA0354	7651

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EXAMINER

LAVARIAS, ARNEL C

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 08/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

ST

Office Action Summary	Application No.	Applicant(s)	
	10/021,988	FLORENCE, JAMES M.	
	Examiner	Art Unit	
	Arnel C. Lavarias	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

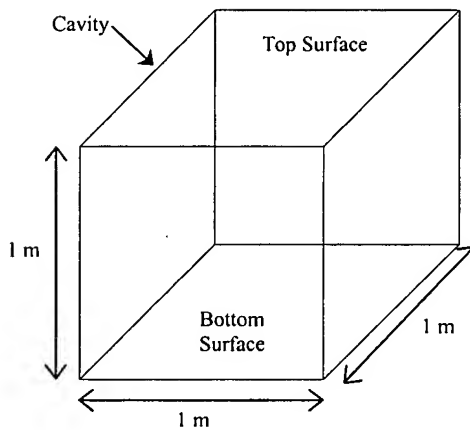
Response to Amendment

1. The amendments to Claims 23-28, 35, and 37-38 in the submission dated 5/27/05 are acknowledged and accepted. In view of these amendments, the objections to the drawings in Section 6 of the Office Action dated 3/23/05 are respectfully withdrawn. Additionally, the objections to the claims in Section 8 and the rejection of Claim 37 in Section 10 of the Office Action dated 3/23/05 are respectfully withdrawn.

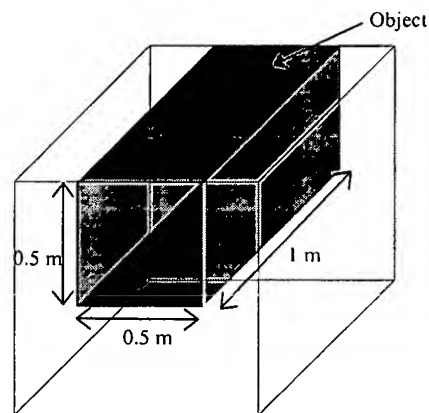
Response to Arguments

2. The Applicant's arguments filed 5/27/05 have been fully considered but they are not persuasive.
3. The Applicant argues, with respect to the specification failing to providing proper antecedent basis for "a volume defined by the product of the adhesive thickness and the air gap cavity area", that Claim 25, as amended, is now provided proper antecedent basis by the specification, that it is irrelevant that the volume be filled, and that Applicant's use of the term "volume" is conventional. The Examiner respectfully disagrees. The Examiner notes that Claim 25 recites the limitation "...air gap cavity..." and thus inherently implies that the cavity is filled with air. Inherently, air, or any particular gas, used to fill a sealed cavity will expand to have the same volume as the sealed cavity. Additionally, whether the recited cavity is filled with a gas or not, the volume of that cavity is defined by the enclosed shape and dimensions of such cavity. Applicant's

claimed limitation that the volume of the air gap cavity be defined by the product of the maximum adhesive thickness and the air gap cavity area is incorrect, particularly when viewed in light of the sealed cavity shown in Figures 1-3 of Applicant's drawings. In addition, Applicant's comment that the air gap cavity volume will not change, regardless of whether wire grid elements encroach into the space is also incorrect. Placing wire grid elements into the air gap cavity takes up volume, which Applicant has not accounted for in defining the volume for the cavity. As an example, the following figure provides a simple explanation of how the volume of the cavity changes when an object is placed within the cavity. It is noted that Applicant's definition of determining the volume of the cavity does not apply once the cavity includes the object.



Exposed Top Surface Area: 1 m^2
 Exposed Bottom Surface Area: 1 m^2
 Cavity Volume before object insertion: 1 m^3



Exposed Upper Surface Area (including exposed object surface area): 2 m^2
 Exposed Bottom Surface Area: 1 m^2
 Object Volume: 0.25 m^3
 Cavity Volume after object insertion: 0.75 m^3

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4. The Applicant argues that, with respect to Claims 22 and 34, the combined teachings of Ito et al. and Matsuda fail to teach or reasonably suggest an adhesive formed between the polarizer second surface perimeter region and the prism second surface, such that a sealed air gap cavity is formed between the prism second surface and the polarizer second surface central region, surrounded by the adhesive. The Examiner respectfully disagrees. It is noted that the features upon which applicant relies (i.e., the air gap cavity being sealed) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). It is also noted that the term 'cavity' is defined as 'an unfilled space within a mass, or a hollowed out space' (See Merriam-Webster's Collegiate Dictionary, 10th edition), and that 'cavity' does not imply that the unfilled space be sealed or totally enclosed by the mass.
5. Claims 22-40 are now rejected as follows.

Specification

6. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 25 recites the limitation "a volume defined by the product of the adhesive thickness and the air gap cavity area" in lines 2-3. Given the optical configuration of the assembly shown in Figures 1-3, the air gap (See 40 in Figure 3 of Applicant's disclosure) confined by the peripheral adhesive and the prism walls (See 36 in Figures 2-3) would

necessarily have some particular volume of air. However, the specification of the disclosure does not specifically set forth the particulars required to determine the appropriate value for the volume, given the assembly configuration disclosed in Figures 1-3. The Examiner additionally notes that the product of adhesive thickness and the air gap cavity area may not result in an exact value for volume, since the thickness of the air gap varies as a function of location due to the heights of the wire grid elements encroaching into the air gap cavity, whereas the adhesive thickness is a fixed value (See in particular 54, 56, 28 in Figure 3 of Applicant's disclosure). Claims 26-29 are dependent on Claim 25, and hence inherit the deficiencies of Claim 25.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 22, 30-34, 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (U.S. Patent Application Publication US 2003/0179345 A1), of record, in view of Matsuda (U.S. Patent No. 5703861), of record.

Ito et al. discloses a polarized light beam splitter assembly (See for example Figure 16) comprising a polarized light beam splitter prism (See 10, 40 in Figure 16) including a first internal surface (See S2i in Figure 16) and a second internal surface (See S1o in Figure 16); a wire grid polarizer (See 21 in Figure 16) including a first surface secured to

the prism first surface (See S2i in Figure 16) and a second surface (See surface on 210 attached to polarizer grid elements 211 in Figure 16) raised from and parallel to the polarizer first surface, with a perimeter region and a central region; an air gap cavity (See 212 in Figure 16) between the prism second surface and the polarizer second surface central region; and a wire grid attached to the polarizer second surface central region, with a height extending into the air gap cavity (See 211 in Figure 16). Ito et al. also discloses a polarized light beam splitter assembly (See Figure 16), the assembly comprising a prism (See 10, 40 in Figure 16) having a source axis oriented to accept light in a first polarization (See incident light having both polarizations in Figure 16) and an emission axis to supply light in a second polarization (See either reflected or transmitted light in Figure 16); a polarizer in a prism (See 21 in Figure 16), including a glass substrate with parallel first surface having a perimeter and second surface (See 210 in Figure 16; Paragraph 0094), and a wire grid (See 211 in Figure 16) having a height and formed overlying the glass substrate first surface; and an air gap (See 212 in Figure 16) interposed between the glass substrate first surface and the prism. Ito et al. additionally discloses the air gap cavity having an area defined by the polarizer second surface perimeter region (See air gap 212 which is demarcated by edges of prism 10 and 40 in Figure 16); the prism is a glass cube split into interfacing first and second sections, wherein the prism first surface is formed on the prism first section interface and the prism second surface is formed on the prism second section interface (See 40, 10 in Figure 16); the cube defining an elongate axis and wherein the prism first and second surfaces have an angle, defined with respect to the elongated axis, in a range of one to eighty nine

degrees (See for example line marked 'L' in Figure 16 and direction of first and second internal exposed surfaces with respect to axis 'L' in Figure 16); a light source positioned to emit light (See for example 160, 170 in Figures 7, 18); a reflection device, such as an LCD (See for example 300 in Figures 1, 8, 10); and wherein the polarizer second surface accepts light from the light source and redirects the light toward the reflection device (See Figures 1, 8, 10). Ito et al. lacks an adhesive formed between the polarizer second surface perimeter region and the prism second surface such that the air gap cavity is surrounded by the adhesive, thus embedding the wire grid polarizer. However, Matsuda teaches an apparatus utilizing an embedded wire grid polarizer (See for example Figure 8), wherein the wire grid polarizer (See 34A, 34B in Figure 8) is secured to an exposed internal surface of a substrate (See 31 in Figure 8) via a spacer or raised projection of solder adhesive (See rectangular spacers connecting 31 and 32 in Figure 8; 47B, 49B in Figure 6) so as to define a gap, which is surrounded by the solder adhesive, between a surface of the wire grid polarizer and the exposed internal surface of the beam splitter prism. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have an adhesive be formed between the polarizer second surface perimeter region and the prism second surface such that the air gap cavity is surrounded by the adhesive, thus embedding the wire grid polarizer, as taught by Matsuda, in the assembly of Ito et al., for the purpose of providing a fixed and rigid alignment of the prism blocks and wire grid polarizer, thus reducing alignment and light scattering losses in the polarized light beam splitter assembly.

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9. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Matsuda.

Ito et al. in view of Matsuda discloses the invention as set forth above in Claim 22. Matsuda further discloses the polarizer wire grid height being less than the adhesive thickness (See Figure 8); and the spacers being formed on the polarizer second surface (See Figures 6, 8-9). Ito et al. in view of Matsuda lack a height defined by the maximum thickness of the adhesive. However, Matsuda further teaches that the air gap separating the embedded wire grid polarizer from the opposing substrate may be defined by the solder adhesive located in a perimeter region of the structure, the thickness of the solder adhesive dictating the size of the air gap (See in particular 34A, 34B, 47B, 49B in Figures 6; 34A, 34B, 31, rectangular spacers connecting 31 and 32 in Figure 8). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a height be defined by the maximum thickness of the adhesive, as additionally taught by Matsuda, in the assembly of Ito et al. in view of Matsuda, to reduce the cost and complexity of the assembly, since fewer materials (such as conventional same-size spacers) are required to assemble and align the optical system.

10. Claims 24, 35, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Matsuda.

Ito et al. in view of Matsuda discloses the invention as set forth above in Claims 22-23, 34, except for the adhesive having a uniform maximum thickness defined between the polarizer second surface (glass substrate first surface perimeter) and the prism second surface (prism first interior surface). However, Matsuda further teaches that the solder

adhesive located in the perimeter of the region may have a thickness to provide the air space cavity between the wire grid elements and the opposing substrate surface (See in particular 34A, 34B, 47B, 49B in Figures 6; 34A, 34B, 31, rectangular spacers connecting 31 and 32 in Figure 8). Although Matsuda does not explicitly disclose the solder adhesives being uniform in thickness, one of ordinary skill in the art would have known to utilize uniformly sized and shaped (i.e. same size and shape) solder adhesives at all of the adhesion points to produce a uniformly sized air space cavity between the wire grid elements and the opposing substrate surface. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the adhesive have a uniform maximum thickness defined between the polarizer second surface (glass substrate first surface perimeter) and the prism second surface (prism first interior surface), as additionally taught by Matsuda, in the assembly of Ito et al. in view of Matsuda, for the purpose of reducing alignment and placement errors between the prisms and the wire grid polarizer.

11. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Matsuda.

Ito et al. in view of Matsuda discloses the invention as set forth above in Claims 22-24, except for the air gap cavity having a volume defined by the product of the maximum adhesive thickness and the air gap cavity area. However, it is noted that one of ordinary skill in the art, given basic knowledge of geometry, would have been able to determine the volume of the air gap cavity as the difference of the product of the maximum adhesive thickness (T_a) and the air gap cavity area (A_{ag}) and the sum of the volumes

taken up by each of the projections ($V_{n,proj}$) of the wire grid polarizer elements into the air gap cavity:

$$volume = (T_a \cdot A_{ag}) - \sum_n V_{n,proj}.$$

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to the air gap cavity have a volume as defined above, to provide additional data and information which may be utilized to further optimize the fabrication, operation and function of the assembly.

12. Claims 26, 27, 29, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Matsuda as applied to Claims 22-25, 34-35 above, and further in view of Yamada et al. (U.S. Patent No. 6013339), of record, and Ishiwatari (JP 11007027 A), of record.

Ito et al. in view of Matsuda discloses the invention as set forth above in Claims 22-25, 34-35, except for the spacers being spherical shaped with a diameter and having a uniform size embedded in the adhesive, the adhesive maximum thickness being equal to the spacer diameter. However, Yamada et al. teaches that spacers may be used in the periphery of the device to attach the substrates together and to form the internal gap, and that the spacers may be in the form of rigid glass beads, all of uniform diameters to provide a gap of uniform thickness (See 2 in Figure 5; col. 10, lines 54-64). Further, Ishiwatari teaches that such uniformly sized spacer beads may be embedded in the adhesive (See Abstract; Figures 1-2), such that air space cavity is the diameter of the spacer beads. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the spacers be spherical shaped with a

diameter and having a uniform size embedded in the adhesive, the adhesive maximum thickness being equal to the spacer diameter, as taught by Yamada et al. and Ishiwatari, in the polarized light beam splitter assembly of Ito et al. in view of Matsuda, for the purpose of sealing and protecting the wire grid polarizer, as well as provide a uniform thickness spacing between the wire grid polarizer and the exposed internal surface of the beam splitter prism.

13. Claims 28, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Matsuda, and further in view of Yamada et al. and Ishiwatari.

Ito et al. in view of Matsuda, and further in view of Yamada et al. and Ishiwatari discloses the invention as set forth above in Claims 22-26, 34-35, except for the adhesive maximum thickness being in the range of one to thirty μm . It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the adhesive thickness to be in the range of one to thirty μm , since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to have the adhesive maximum thickness have a width in the range of one to thirty μm for the purpose of reducing fabrication costs (since larger air gap widths require a spacer with an appropriately larger thickness or diameter) while providing a controlled air gap spacing. *In re Aller*, 220 F.2d 618, 195 USPQ 6 (CCPA 1977). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 9:30 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

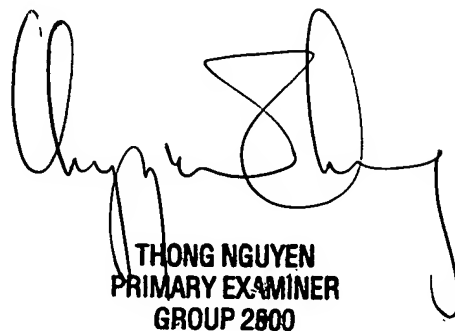
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Arnel C. Lavarias

7/28/05



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